The economic impact would include the loss of 36 structures and 1,640 feet of roads (all of Bogue Court and portions of Inlet Drive and Inlet Court) and associated utilities. Emerald Isle still plans to provide beach nourishment along the west end of its shoreline, the cost of nourishing the 23,831 feet of beach using an offshore sand source was added to the economic losses associated with the erosion of the inlet shoreline in order to obtain a full measure of the total economic impact of the without project condition. Table 14 provides the total economic impact of Alternative A including the estimated $5.8 million for nourishing the west end of Emerald Isle from an offshore sand source.

Table 14
Total Costs for Without Project – Alternative A – No Action
Including Offshore Nourishment Cost for the West End of Emerald Isle

Year	Total PW Damages & Economic Impact Plus Offshore Dredging Costs
2	$ 7,670,300
4	$ 11,083,400
6	$ 13,763,400
8	$ 16,707,100
10	$ 20,393,500

Cumulative Effects. The loss of the 36 homes over the 10-year analysis period would permanently remove them from the tax base for both the town and county, therefore, the effects on local tax revenues would extend well beyond 10 years. The same would apply to the reduction in household spending as the displaced property owners would no longer purchase goods and services in the area. The demolition of the affected structures and debris resulting from the loss of roads and utilities would have a significant impact on the life of local sanitary landfills.

Compatibility with Project Objectives. Alternative A would fail to reduce erosion of the inlet shoreline and as a result would not preserve or maintain the town and county tax base. The continued eastward migration of the inlet shoreline would also destroy a considerable amount of infrastructure including 1,640 feet of roads and associated utilities. Damages to homes and infrastructure would range from $1.6 million in year 2 to $11.5 million in year 10 with the total economic impact ranging from $1.9 million in year 2 to $14.6 million in year 10. Since the Town of Emerald Isle would have to revert to using an offshore borrow area to complete Phase 3 of its beach nourishment project, the quality of the beach nourishment material the resulting fill could contain higher percentages of shell and shell hash compared to the natural beach. The public access to the inlet shoreline could not

be reestablished which would have an impact on the recreational use of the inlet beaches.

Alternative B – Without Project – Relocate Homes

Direct and Indirect Impacts. Alternative B involves the relocation of homes once they become threatened with the property owners relocating the structures to some other location within the town limits of Emerald Isle. The inlet shoreline erosion rate used to evaluate this alternative was the same as the Alternative A, i.e., 60 feet/year. Thus, the timeline and the number of structures that would become threatened are the same as the Alternative A. The relocation alternative involves the following:

a. Purchase of a new lot
b. Site work at the new lot that would include the installation of new utilities and the driving of new pile foundations.
c. Clean-up of the abandoned lot. This would include the removal of any concrete slabs and the removal of the old septic system and other utilities.
d. Prepare and move the structure to the new lot.
e. Connecting the structure to the utilities installed on the new lot.

A summary of the cost and damages for the Alternative B for each 2-year increment of the analysis is provided in Table 15. As was the case with the Alternative A, the Home Relocation Alternative would not provide any material for Phase 3 of the permitted Emerald Isle beach nourishment project. Therefore, the town would have to complete Phase 3 using the approved offshore borrow areas at a cost of $5.8 million. The cost for constructing Phase 3 of the permitted Emerald Isle beach nourishment project using an offshore borrow area is included in the total cost column in Table 15.

Table 15
Summary of Cost and Damages
Alternative B – Relocate Homes
Including Offshore Nourishment for Phase 3 Town of Emerald Isle

Year	Cumulative Present Worth Cost to Property Owners	Cumulative Present Worth Damage to Infrastructure	Cumulative Present Worth Lost Tax Revenues Town & County	Present Worth Cost and Damages	Phase 3 Beach Nourishment Cost Using Offshore Borrow Area	Total Economic Cost for Relocation Alternative
2	$1,482,000	$267,300	$6,900	$1,756,200	$5,800,000	$7,556,200
4	$3,087,900	$358,700	$31,800	$3,478,400	$5,800,000	$9,278,400
6	$4,361,600	$475,500	$71,500	$4,908,600	$5,800,000	$10,708,600
8	$5,060,700	$575,300	$124,400	$ 5,760,400	$5,800,000	$11,560,400
10	$7,127,500	$667,200	$191,000	$ 7,985,700	$5,800,000	$13,785,700

Cumulative Effects. The relocation of 36 homes over the 10-year analysis period would preserve the value of the structure but would result in the permanent removal of the value of the abandoned and eroded lot from the tax base of the town and county. This loss in tax revenues would be compounded well beyond the end of the 10-year analysis period.

Compatibility with Project Objectives. The relocation alternative, which also involves the continued eastward migration of the inlet channel and its associated erosion of the inlet shoreline, would not control the inlet shoreline erosion or protect the development at the Pointe. The total economic impact of the Structure Relocation Alternative would range from $1.75 million in year 2 to $8.0 million in year 10. A total of 36 structures would be moved from the Pointe area to other sections of Emerald Isle, which would preserve some of the tax base, however, the Town and County would lose the tax value of 41 lots (36 developed and 5 vacant). As with the No Action Alternative, 1,640 feet of roads and utilities would be lost. Public beach access at the Pointe would not be restored to past conditions and the inlet shoreline habitat would continue to deteriorate. This alternative would also cost individual property owners $7.1 million over a 10 year period. While the economic impact of this alternative is less than the Alternative A, the losses to the local economy and tax base would be substantial. As with the No Action Alternative, beach nourishment material for Phase 3 of the permitted Emerald Isle beach nourishment project would be obtained from offshore borrow areas at a cost of $5.8 million. Therefore, impacts on recreational opportunities along the Town's ocean shoreline would be the same as Alternative A, i.e., the quality of the beach fill material would be less than ideal.

Alternative C – Without Project - Sand Bag Revetments

Direct and Indirect Impacts. The economic impact of Alternative C was based on the assumption that sand bag revetments would be constructed to protect buildings and roads once they become threatened. In this regard, the State of North Carolina considers a structure to be threatened once the erosion encroaches within 20 feet of its foundation. In the case of a road, the threatened status begins when erosion reaches the road right-of-way. State rules allow temporary sand bags protecting buildings to remain in place for a period of 2 years after which they must be removed. Sandbag structures constructed to protect roads are allowed to remain in place for 5 years after which they too must be removed. In practice, the State has granted some extensions of the 2-year and 5-year rules, particularly if a long-term protection plan is being formulated. However, for the without project analysis, the assumption was made that no long-term plans are being considered and that the sand bags must be removed at the end of their permit period.

The analysis was carried out on a yearly basis over a period of 10 years using an inlet shoreline erosion rate of 60 feet/year. When erosion threatened a structure, a sand bag revetment would be installed and remain in place for a period of 2 years after which the sand bags would have to be removed resulting in the loss of the structure and exposure of the next row of homes to the erosion threat. When a section of a road is threatened, sand bags would be installed to protect that section of the road. The sand bags protecting the road would remain in place for a period of 5 years after which the sand bag structure would have to be removed resulting in the loss of that section of the road and an increased threat to other sections of the roads which would also be protected by sand bags.

Future damages and economic impacts to Emerald Isle and Carteret County for Alternative C are summarized in Table 16 with the total economic impact, including beach nourishment from an offshore sand source, provided in Table 17.

Table 16
Summary of Damage and Impact on Local Economy
Alternative C – Sandbag Revetments

Year	Cumulative Present Worth Damages [(1)]	Cumulative Present Worth Lost Taxes Town & County	Cumulative Present Worth Reduction in Household Spending	Total Present Worth Economic Impact
2	$1,099,900	$16,800	$208,000	$1,324,700
4	$2,101,500	$34,300	$426,000	$2,561,800
6	$3,992,600	$66,300	$726,000	$4,784,900
8	$6,218,500	$113,100	$1,178,100	$7,509,700
10	$8,134,900	$183,500	$1,859,400	$10,177,800

[(1)] Includes lost structures, damage to infrastructure, temporary access roads and costs associated with sand bags.

Table 17
Total Costs for Alternative C – Sandbag Revetments
Including Offshore Nourishment Cost for the West End of Emerald Isle

Year	Total PW Damages & Economic Impact Plus Offshore Dredging Costs
2	$7,124,700
4	$8,361,800
6	$10,584,900
8	$13,309,700
10	$15,977,800

Cumulative Effects. The use of sand bags to provide interim protection to threatened homes and roads would slow but not completely eliminate the erosion of the Pointe subdivision associated with the eastward migration of the inlet shoreline. Over the 10-year analysis period, the value of 23 structures along with their lots would be permanently removed from the town and county tax bases. Thus, there would be a recurring loss to the town and county tax revenues well beyond the 10-year analysis period. The displaced 23 property owners would also impact the local economy for years to come as a result of reduced household spending. While the number of structures that would be demolished under Alternative C is less than Alternative A, there would still be a significant impact on the capacity of existing sanitary landfills.

Compatibility with Project Objectives. The installation of interim sand bags to protect threatened structures and infrastructure on the west end of Emerald Isle would only delay and not eliminate the continued migration of the inlet channel to the east. While such a delay would possible allow more time for the channel to naturally move to a more central position between Bogue Banks and Bear Island, there is no way to predict when or if this would occur. The sand bags would reduce structure loss to 23 and reduce the loss of roads and utilities to around 900 feet; however, the total economic impact would still be rather significant, ranging from $1.3 million in 2 years to about $10.2 million in 10 years. Public access to the inlet from the Pointe would not be restored to past conditions and the installation of the interim sand bags would be perhaps more detrimental to the habitat along the inlet shoreline compared to the No Action and Relocation Alternatives. Nourishment of Phase 3 would still have to be accomplished with material obtained from the offshore borrow areas with the same consequences on recreational opportunities as the Alternatives A and B. Again, nourishment of Phase 3 from an offshore borrow area would cost $5.8 million.

Alternative E – Channel Relocation without Beach Nourishment

Direct and Indirect Impacts. Relocating the Bogue Inlet bar channel to a more central location and using the dredged material to fill in the existing channel would control the erosion of the inlet shoreline for at least 15 years and possibly 35 years depending on the migratory behavior of the relocated channel. If the material dredged to construct the new channel is stockpiled on the inlet shoals located between the existing channel and the new channel, a sand bag dike would have to be constructed around the stockpile area to prevent erosion of the stockpiled material by tidal currents. Due to the relatively short pumping distance from the channel to the stockpile areas, the dredging cost for the new channel would be around $3.0 to $3.5 million, however, if a sand bag dike is constructed around the perimeter of the shoal area, the cost of the sand bag dike cost between $3.0 and $5.0 million resulting in a total construction cost for Alternative E between $6.0 million and $8.5 million. In addition, the Town of Emerald Isle would still be faced with the cost of nourishing Phase 3 of its beach nourishment project using an offshore borrow area. This would cost an additional $5.8 million making the total cost of Alternative E between $11.8 million and $14.3 million.

Cumulative Effects. The movement of the inlet channel to a central position will cause the western 7,500 feet of Emerald Isle to erode. However, the amount of shoreline recession would not cause any significant risks to development located along this section of the shoreline as much of the existing dune system would remain and the distance from the structures to the adjusted shoreline would still provide adequate storm protection. The tax base of Emerald Isle would be preserved as would household spending so that these factors would continue to have a positive influence on the local economy for many years.

Compatibility with Project Objectives. The relocation of the inlet channel that would occur under Alternative E would control the erosion of the Pointe shoreline and would preserve the development and infrastructure on the west end of Emerald Isle. As a result, the Town's tax base would be maintained. Material for nourishing the west end of Emerald Isle would have to be obtained from the offshore borrow areas which would add to the total cost of the project. Stockpiling the inlet channel material on the Bogue Banks spit or the inlet shoal areas, in addition to causing some environmental harm, would also add to the cost of the project. As a result, the total cost of the project under Alternative E would exceed the budget for the project established by the Town of Emerald Isle.

Alternative F – Channel Relocation with Beach Nourishment

Direct and Indirect Impacts. Relocating the Bogue Inlet bar channel to a more central location and using the dredged material to fill in the existing channel would control the erosion of the inlet shoreline for at least 15 years and possibly 35 years depending on the migratory behavior of the relocated channel. As a result, the

town and county tax bases would be preserved. The recovery of the inlet shoreline would allow the reestablishment of public access to the inlet area to past conditions which should enhance recreational opportunities and hence the economy of the town. The inlet material, which is completely compatible with the native beach material, would establish a high quality recreational beach which would also enhance recreational opportunities and have a positive influence on tourist trade.

Cumulative Effects. The relocation of the inlet channel that would occur under Alternative F would control the erosion of the Pointe shoreline and would preserve the development and infrastructure on the west end of Emerald Isle. As a result, the Town's tax base would be maintained. With the inlet material being used to nourish Phase 3 of the permitted Emerald Isle beach nourishment project, the Town of Emerald Isle would be able to accomplish two major goals at a minimum cost, i.e., protection of the Pointe subdivision and establish a high quality ocean beach for recreation and storm damage protection.

Compatibility with Project Objectives. Alternative F would accomplish all of the economic objectives of the project by (1) preventing the short term impact of losing 5 to 7 homes over the next few years, (2) maintaining the tax base for both the town and county for at least 15 years and possibly 35 years, (3) allow for the reestablishment of public access to the inlet shoreline to past conditions, and (4) provide high quality beach nourishment material for Phase 3 of the beach nourishment project within the town's budget constraints.

5.24 NON-RELEVANT RESOURCE ISSUES

The following issues have been determined to be non-relevant due to the absence of project affects on the resource.

5.24.1 **Hazardous, Toxic, and Radioactive Waste**. There are no known hazardous, toxic, or radioactive wastes in the project areas that would be affected by the chosen alternative actions. There is a potential for hydrocarbon spills with dredging and construction equipment in the areas, but accident and spill prevention plans delineated in the contract specifications should prevent most spills.

5.24.2 **Noise**. Construction based on the recommended alternatives would temporarily raise the noise level in the areas of the dredge and the discharge point on the beach and at the closure dike site. Construction equipment would be properly maintained to minimize these effects in compliance with local laws.

5.24.3 **Energy Requirements and Energy Conservation**. Energy requirements for the proposed alternatives would be confined to fuel for the dredge, labor transportation, and other construction equipment.

5.25 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

The following section delineates the applicable Federal and State regulations with which the applicant's preferred alternative must comply prior to issuance of agency approvals for project implementation. Table 14 provides a summary of the applicable regulations and the compliance status of the project.

5.25.1 **National Environmental Policy Act**. A Preliminary Draft Environmental Impact Statement (EIS) for the Bogue Inlet Channel Relocation Project will be submitted to the Federal, State and the Project Delivery Team members in September 2003 for review. A Final EIS will be developed based on the results of comments received from the Draft EIS and coordination efforts during the development of the project. The proposed project will be in full compliance with the National Environmental Policy Act.

5.25.2 **Endangered Species Act**. Coordination with the U.S. Fish and Wildlife Service and NOAA National Marine Fisheries Service (NMFS) includes consultation under Section 7 of the Endangered Species Act of 1973, as amended. The USACE initiated 'informal consultation' with the U.S. Fish and Wildlife Service in December 2002. Based on information submitted under Section 7 consultation, the NMFS determined that the proposed action is not likely to adversely affect any listed species under their purview. The project will be coordinated fully under the Endangered Species Act (ESA).

5.25.3 **Fish and Wildlife Coordination Act**. A Final Coordination Act Report (CAR) will be developed by the U.S. Fish and Wildlife Service in coordination with the USACE upon completion of the Biological Opinion. This project will be in full compliance with this Act.

5.25.4 **National Historic Preservation Act**. Archival research, field work and coordination with the North Carolina State Historic Preservation Officer (SHPO), have been conducted in accordance with the National Historic Preservation Act of 1966 (Public Law 89-665), the National Environmental Policy Act of 1969 (Public Law 11-190), Executive Order 11593, the Advisory Council on Historic Preservation Procedures for the protection of historic and cultural properties (36 CFR Part 800) and the updated guidelines described in 36 CFR 64 and 36 CFR 66.

The North Carolina Office of State Archaeology (OSA) protects endangered archaeological sites on private or public lands through enforcement of the North Carolina Archaeological Resources Protection Act (G.S. 70, article 2), the North Carolina Archaeological Records Program (G.S. 70, article 4), and the "Abandoned Shipwreck Law" (G.S. 121, article 3). The project will be in compliance with each of these Federal and State Laws.

Cultural resources investigations of Bogue Inlet include magnetometer and side-scan sonar surveys. Three magnetic anomalies were detected, one in the vicinity of the proposed dike and two in the proposed channel. The only anomaly thought to be of historic significance was located in the vicinity of the proposed dike. Since this area will be filled, no impact on the potential historic artifact would occur. The two anomalies in the channel area were relatively small and believed to be modern debris such as a crab trap, anchor, or pipe and are not historically significant. The study concluded that no further investigations are needed. A copy of these investigations was sent to the U.S. Army Corps of Engineers, Wilmington District office on July 25, 2003 for distribution to the State Historic Preservation Officer.